
ISDN QSIG

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Regional material statement

ISDN BRI trunking is not available in North America. Contact your system supplier or your Nortel Networks representative to verify support of this product in your area.

Feature description

The European Computer Manufacturer's Association (ECMA) has defined an ISDN protocol that specifies the Layer 3 signaling requirement for support of circuit switched call control at the "Q" reference point between Private Telecommunications Network Exchanges (PTNXs) connected within a Private Telecommunications Network (PTN). This protocol has been adopted by the European Telecommunications Standards Institute (ETSI) and the International Standards Organization (ISO). Most of the major European PTNX manufacturers will be supporting ISDN connectivity based on this standard.

QSIG is oriented towards signaling and services that occur between two switches. For example, two PBXs, or a PBX and a Centrex switch could exchange signaling for services across a "Q" reference point.

The QSIG interface will support the following services:

- Call Establishment and Tear Down
- ETSI or ISO version of basic call
- 64 kbps clear data
- Overlap Sending/Receiving
- Channel Negotiation
- Calling and Connected Parties Information (CLIP/COLP)
- Calling and Connected Parties Restriction (CLIR/COLR)
- Flexible Numbering Plan
- TIE call types
- nB+D with n ranging from 1 to 480 for PRI
- Transit Count information transmitted when ISDN Call Connection Limitation (ICCL) is present

The QSIG interface is supported on PRI, and BRI, and ISDN Signaling Links (ISLs). The QSIG interface does not have any transit capability for supplementary services, nor does it support any supplementary services besides the CLIP/COLP and CLIR/COLR.

QSIG development underscores Nortel Network's commitment to global standards. QSIG will provide a greater interworking of voice, image, video, and data services in multi-vendor environments. Users will also be able to combine ISDN PRI with ISDN BRI to deliver enhanced services via end-to-end ISDN networks.

Operating parameters

There are no operating parameters specified for this feature.

Feature interactions

Networking Features

Some networking features currently exist on more than one ISDN interface implemented on Meridian 1. These features are listed in Table 68. Any networking feature that does not appear in the table is only supported on one ISDN interface and is rejected by the gateway when the service is requested. That is the case for all Meridian Customer Defined Network (MCDN) features that are not supported over the QSIG interface.

Table 68
Networking features that exist on more than one ISDN interface implemented on Meridian 1

	Euro-ISDN	MCDN	QSIG	BRI sets	DPNSS	MFC	MFE	DTI2	Analog	1TR6	NUMERIS	AXE10
Calling Line ID	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y
Connected Number	Y	Y	Y	N	Y	N	N	N	N	Y	N	N
Transit Counter	N	Y	Y	N	Y	N	N	N	N	N	N	N
Call Charge	Y	N	N	N	N	N	N	Y	Y	Y	Y	N

Trunk Route Optimization

Trunk Route Optimization (TRO) is supported within the Meridian 1 network only. When a redirecting node sends a message to the originating node and the TRO request is accepted, the new call can go through the QSIG interface as a normal basic call. However, TRO signaling will not be able to operate on the QSIG interface.

Network Call Redirection

The existing Network Call Redirection limitation on unsupported interfaces applies to the QSIG interface. When a call is terminated on the Meridian 1 and network call redirection is active, the feature can still be operated but the Original Called number and the Redirection number Information Elements (IEs) which are used by the Network Call Redirection feature will not be sent on by the QSIG interface.

ISDN Signaling Link (ISL)

The existing ISL operation is supported on the QSIG interface on the PRI/PRI2 interface only.

Network Attendant Service (NAS)

The interaction with NAS is as though the call is going to a route without NAS equipped. The only information exchanged between NAS and the QSIG interface is the transit count. Other information contained in the Progress IE will be handled by a future development.

Call Forward, Break-In and Hunt Internal or External Network Wide

Call Forward, Break-In and Hunt Internal or External Network Wide uses the Network Attendant Service equivalent information that is transported on protocols such as Party Category and Progress Indicator for QSIG.

Virtual Network Services (VNS)

VNS provides ISDN features when no MCDN link is available between two switches. This can be done when analog lines are available or when ISDN links that provide no supplementary services are used. The existing link is used as a B-channel, and a separate D-channel handles the MCDN signaling between the two end switches.

A QSIG link can be used as a B-channel for the VNS feature over a private network. All VNS services are then supported as normal; the QSIG link is only used as a speech bearer.

Feature packaging

A new QSIG Interface (QSIG) package 263 must be provisioned to activate this feature.

The following software packages are also required for QSIG:

- Digit Display (DDSP) package 19;
- Integrated Services Digital Network (ISDN) package 145;
- Primary Rate Access (PRA) package 146;
- 2.0 Mb Primary Rate Access (PRI2) package 154;
- Overlap Signaling (OVLP) package 184;
- International Primary Rate Access (IPRA) package 202.

Feature implementation

Task summary list

The following is a summary of the tasks in this section:

- 1 LD 17 – Assign the configuration record.
- 2 LD 16 – Define a Route Data Block.
- 3 LD 97 – This overlay defines the Extended Peripheral Equipment (XPE) configuration.

RCAP: ?
CNEG: ?

LD 17 – Assign the configuration record.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	CFN	Configuration Record.
...		
IFC	ISIG ESIG	Interface ID for ISO QSIG. Interface ID for ETSI QSIG.
TIMR	(NO) YES	NO = skip timer prompt. YES = change timer value.
T310	10-(30)-60	10-60 seconds (one-second increments). 30 seconds is the default value.

LD 16 – Define a Route Data Block.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	RDB	Route Data Block.
...		
DGTP	PRI BRI	Digital route type.
IFC	ISIG ESIG	New DCH interface ID.

LD 97 – This overlay defines the Extended Peripheral Equipment (XPE) configuration.

Data relating to the software downloading for the MSDL card will remain in the overlay. Hence, this overlay must be modified to accept the parameters required for downloading the PRI application data files. The parameters basically specify conditional or forced downloading.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	SYSM	System parameters for MSDL/MISP cards.
...		
FDLC		Peripheral Software Download Option.
	P1	This will be set to the application and its data files, such as BRIE, and PRIE.
	P2	Specifies conditional (C) or forced downloading (F).

Feature operation

There are no operating procedures specified for this feature.

ISDN QSIG Alternate Routing

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Regional material statement

The information presented in this section does not pertain to all market regions. Contact your system supplier or your Nortel Networks representative to verify support of this product in your area.

Feature description

The ISDN QSIG Alternate Routing feature provides a solution to calls encountering congestion due to high traffic situations within a QSIG network. Both the QSIG interface protocols, European Telecommunications Standard Institute (ETSI), and International Standards Organization (ISO), are supported by this feature.

This feature uses the routing capability of Network Alternate Route Selection (NARS) to re-route a congested call. For each QSIG call translated at a Meridian 1 node, NARS selects one route from up to 512 routes to complete the call. These routes are programmed in a route list. Each route in the list is called an entry. There may be up to 64 entries in each route list. Any combination of trunks (such as public exchange, TIE) can be specified in a route list.

QSIG Alternate Routing may be configured for each of the 512 different routes.

Congestion occurs when all trunks of a route are busy. With the introduction of the QSIG Alternate Routing feature, each entry of a route list on one node can be configured to take an alternate entry (route) from the route list of that node (Private or Public Exchange), if congestion is encountered.

Using LD 86, the Electronic Switched Network (ESN) administration overlay, the option defined for the Step Back On Congestion (SBOC) prompt determines the type of alternate routing available to calls over a particular route. These options may be as follows:

- NRR (no alternate routing is performed. The call receives congestion treatment).
- RRO (reroute if a call encounters congestion at the originating node. If congestion is encountered at a transit node, the call drops back to the originating node, so that the originating node decides if re-routing is required. The drop-back functionality, which is part of the ISDN Drop Back Busy feature, is also configured in LD 86, using the IDBB prompt).
- RRA (reroute the call at any node, whether congestion is encountered at the originating or transit node).

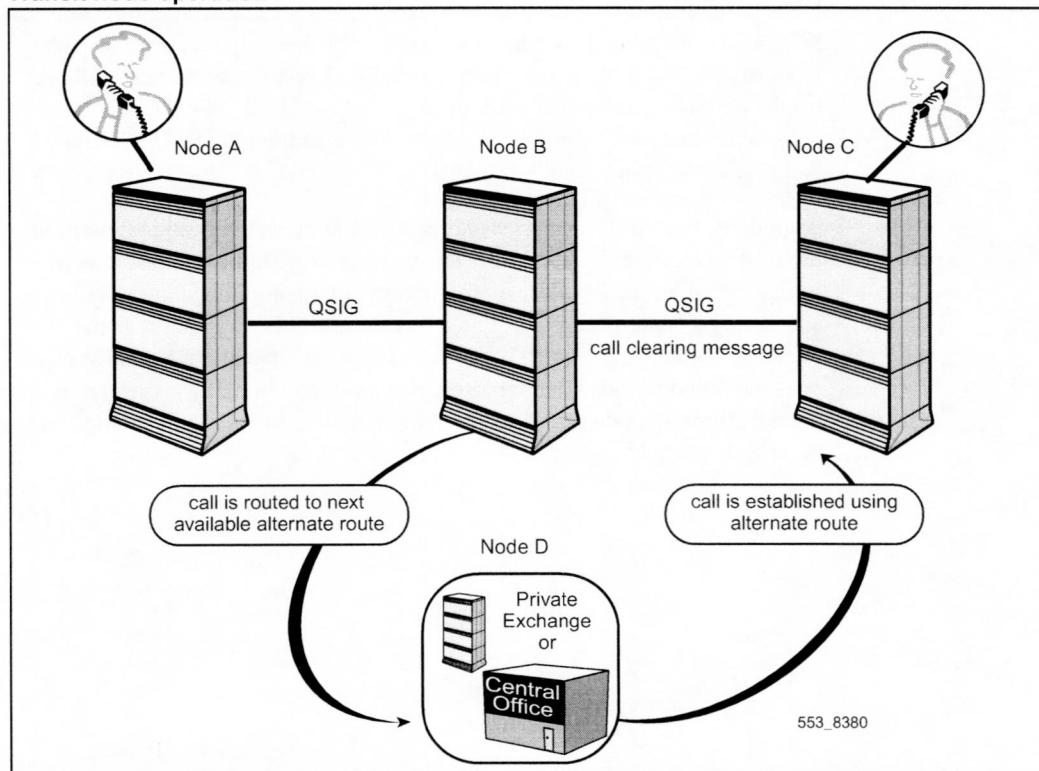
QSIG Alternate Routing is triggered at the controlling node when a Call Clearing message (DISCONNECT or a REJECT) is received, and the cause value is to activate QSIG Alternate Routing. The cause values are defined using LD 86 (see page 932).

Transit node operation

Consider the following calling scenario for a transit node operation (refer to Figure 72). An attempt is being made to establish a call over a QSIG link, from originating node A to terminating node C, via transit node B. All the trunks pertaining to the call attempt at node C are busy. Node C sends congestion message information, along with a supported QSIG Alternate Routing cause value, back to node B.

At node B, the SBOC option, as defined in LD 86, is checked to determine the routing treatment. If SBOC = RRA, the next free alternate route is tried. In our example, the first free alternate route that is found is between node B and node D. Node D can either be a Private or Public Exchange. If the Network Class of Service access checks are passed, the direct leg between the congested node (node C) is released, and a indirect new leg is created to node C, through node D. The call would then be established from node A, to node B, to node D, to node C.

Figure 72
Transit node operation



An attempt is made to find a free alternate route until all of the alternate routes, as defined in LD 86 (refer to the ROUT prompt on page 932), are tried. If no free alternate route is available, the congestion message information is sent from node B to the originating node A, where the QSIG Alternate Routing functionality is activated. If no alternate routes are found, the call receives network blocking treatment, as defined by prompt NBLK in LD 15, as part of the initial customer configuration.

If SBOC = RRO, the congestion information is passed back from transit node B to the originating node A. At node A, QSIG Alternate Routing is activated in an attempt to find an alternate route to set up the call from node A, to node B, to node D, to node C.

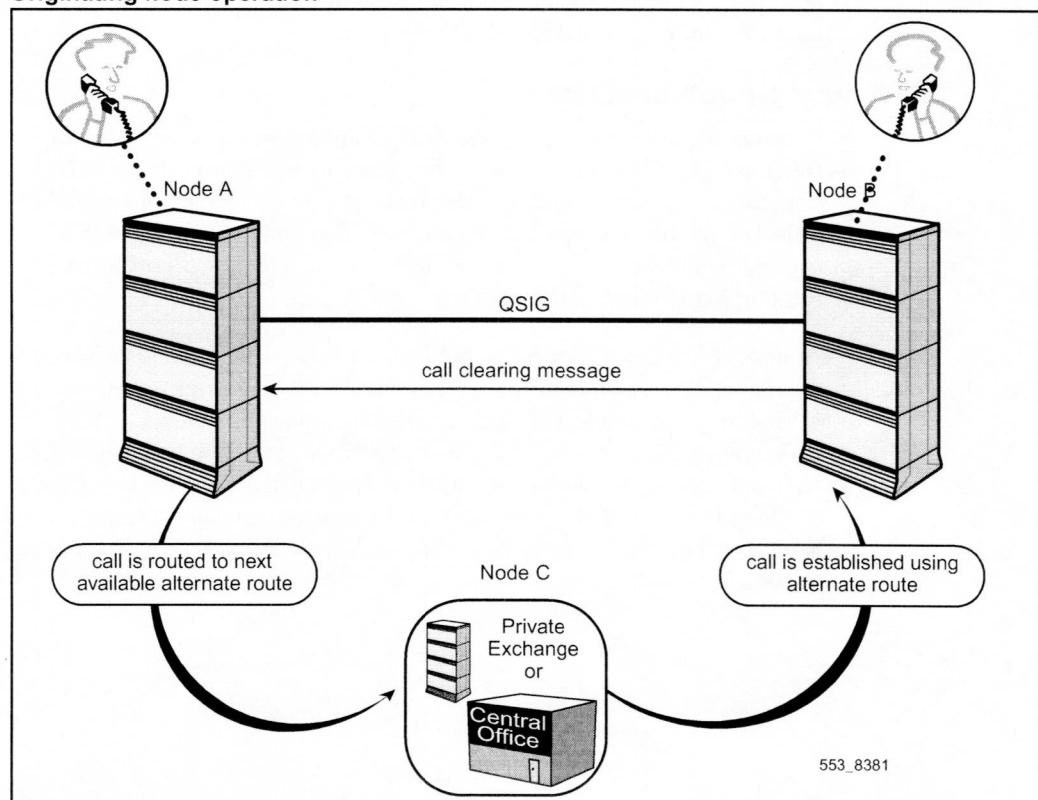
If SBOC = NRR, no alternate routing is performed. The call receives network blocking treatment, depending on the congestion cause value and the type of treatment defined by prompt NBLK in LD 15.

Originating node operation

Consider the following calling scenario for an originating node operation (refer to Figure 73). An attempt is being made to establish a call over a QSIG link, from originating node A to terminating node B. All the trunks All the trunks pertaining to the call attempt at node B are busy, so node B sends congestion message information, along with a supported QSIG Alternate Routing cause value, back to node A.

At node A, the SBOC option, as defined in LD 86, is checked to determine the routing treatment. If SBOC = RRA or RRO, the next free alternate route is tried. In our example, the first free alternate route that is found is between node A and node C. Node C can either be a Private or Public Exchange. If the Network Class of Service access checks are passed, the direct leg between the congested node (node B) is released, and a new indirect leg is created to node B, through node C. The call would then be established between node A, to node B, to node C.

Figure 73
Originating node operation



An attempt to find a free alternate is made until all of the alternate routes, as defined in LD 86 (refer to the ROUT prompt on page 932), are tried. If no alternate routes are found, the call receives network blocking treatment, as defined by prompt NBLK in LD 15, as part of the initial customer configuration.

If SBOC = NRR, no alternate routing is performed. The call receives network blocking treatment, depending on the congestion cause value and the type of treatment defined by prompt NBLK in LD 15.

Operating parameters

There are two forms of QSIG Call Transfer - QSIG Call Transfer by the "rerouting" method, and QSIG Call Transfer by the "join" method. QSIG Alternate Routing and the QSIG Call Transfer by the "re-routing" method are mutually exclusive.

Optional Information Elements (IEs) may be lost at a rerouting node. Only the following optional Information Element (IEs) are tandemmed in the SETUP of the alternate call, if they are present in the congested call:

- Calling number
- Called and calling subaddress
- High layer compatibility
- Low layer compatibility

On a QSIG network, optional IEs (like progress IEs) carried in the SETUP messages are lost when the alternate routing occurs at a transit node. Mandatory IE are always tandemmed transparently.

GF facility information is lost at a transit node. If QSIG Alternate Routing is performed, Facility IEs contained in the SETUP message are lost, so services like QSIG Name Display, QSIG Call Diversion (rerouting and by join method) are not delivered to the end-user. QSIG Alternate Routing is exclusive with QSIG Call Transfer, if the rerouting method is used. This does not have a major impact, since QSIG Call Transfer by rerouting is optional, whereas QSIG Call Transfer by join is mandatory. It is therefore advised that if a third-party PBX is part of a QSIG network, QSIG Call Transfer by join method is used.

Missing progress IEs due to QSIG Alternate Routing activation may create a situation where a call fails involving an ISDN BRI set. This may occur when a Meridian proprietary set calls an ISDN BRI set over a QSIG link, and QSIG Alternate Routing is triggered. In this case the Progress Indicator Number 3 "Originator is not ISDN" is lost.

Route Access codes are not supported. A Coordinated Dialing Plan (CDP) or a Uniform Dialing Plan (UDP) is required for the QSIG Alternate Routing feature.

Feature interactions

Drop Back Busy and Off-Hook Queuing

QSIG Alternate Routing takes precedence over ISDN Drop Back Busy, if both are configured on an MCDN-to-QSIG gateway node.

Intercept treatment

If QSIG Alternate Routing fails to find an alternate route for a call encountering congestion at a transit node, intercept treatment is not applied at the transit node. The call is dropped back to the originating node, with the appropriate congestion IE information.

Overlap Sending

QSIG Alternate Routing is supported over both the enbloc and overlap signaling methods.

QSIG Name Display

When QSIG Alternate Routing is triggered at a tandem node, no calling name display information is sent in the call SETUP message for the new call over the alternate route. However, the calling name display information is sent from an originating node or at an MCDN-to-QSIG gateway node, if it is available.

QSIG Path Replacement

QSIG Alternate Routing cannot be applied to a QSIG Path Replacement call set-up. Therefore, QSIG Path Replacement is rejected if congestion is encountered.

Virtual Network Services

QSIG Alternate Routing can function over all QSIG-based bearer interfaces supporting Virtual Network Services.

MCDN End to End Transparency

When QSIG Alternate Routing is triggered at a tandem node, the Facility IE messages containing the Network Attendant Services (NAS) and Network Attendant ACD (NACD) information are not included in the SETUP message for the new call over the alternate route.

Feature packaging

The following packages are required for the QSIG Alternate Routing feature:

- Basic Routing (BRTE) package 14
- Network Class of Service (NCOS) package 32

One of the following:

- Basic Alternate Route Selection (BARS) package 57
- Network Alternate Route Selection (NARS) package 58
- Coordinated Dialing Plan (CDP) package 59

Feature implementation

Task summary list

The following is a summary of the tasks in this section:

- 1 LD 86 – Configure the QSIG Alternate Routing options.

LD 86 – Configure the QSIG Alternate Routing options.

QSIG Alternate Routing may be configured for each of the 512 different routes.

Prompt	Response	Description
REQ	CHG	Change existing data.
CUST	xx	Customer number, as configured in LD 15. xx = 0-99 for Options 51C-81C xx = 0-31 for Option 11C.
FEAT	RLB	Configure the Route List as a feature.
MXLC	0-1000	Maximum number of NARS Location Codes.
RLI	xxx	Route List Index to be accessed. xxx = 0-127 if a Coordinated Dialing Plan is used. xxx = 0-255 if NARS is configured. xxx = 0-999 if the Flexible Numbering Plan is configured.
ENTR	0-63	Entry number for the NARS route list.

ROUT	0 - 511 0-127	Route Number for Options 51C-81C. Route Number for Option 11C.
...		
SBOC	(NRR)	Step Back On Congestion option. No re-routing.
	RRO	Re-route if congestion is encountered at the originating node; if congestion is encountered at a transit node, drop-back to the originating node, so that the originating node decides if re-routing is needed (the IDBB prompt in this LD 86 must be set to DBA or DBI).
	RRA	Re-route whether congestion is encountered at the originating or tandem node.
- COPT		Conditions that may cause QSIG Alternate Routing. These values are contained in signaling messages that trigger alternate routing. The COPT prompt is generated only if SBOC = RRO or RRA.
	(1)	QSIG Alternate Routing is supported due to the following causes: — Cause 34, "No Channel or Circuit Available" — Cause 38, "Network Out of Order" — Cause 42, "Congestion"
	2	QSIG Alternate Routing is supported due to the following causes: — Cause 27, "Destination is Out of Service" — Cause 34, "No Channel/Circuit Available" — Cause 38, "Network Out of Order" — Cause 42, "Congestion"

IDBB		ISDN Drop Back Busy options.
	(DBD)	Deny Drop Back Busy.
	DBA	Allow Drop Back Busy on, if all route sets are busy.
	DBI	Allow Drop Back Busy, if all Initial route sets are busy.
...		

Feature operation

No operating procedures are required to use this feature.

ISDN QSIG Basic Call

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Regional material statement

ISDN BRI trunking is not available in North America. Contact your system supplier or your Nortel Networks representative to verify support of this product in your area.

Feature description

Integrated Services Digital Network (ISDN) Q Reference Signaling Point (QSIG) Basic Call complies with the ISDN protocol that specifies the Layer 3 signaling requirement for support of circuit switched call control at the "Q" reference point between Private Telecommunications Network Exchanges (PTNXs) connected within a Private Telecommunications Network (PTN).

This protocol has been adopted by the European Telecommunications Standards Institute (ETSI) and the International Standards Institute (ISO). Most of the major European PTNX manufacturers will be supporting ISDN connectivity based on this standard. This applies to both ISDN PRI and ISDN BRIT (trunk application.)

QSIG is oriented toward signaling and services that occur between two “peer-to-peer” switches across a “Q” reference point. For example, two PBXs, a PBX and a Centrex switch or two Centrex switches could exchange signaling and services across a “Q” reference point.

The ISDN QSIG Basic Call feature introduces the following basic call services on Meridian 1 ISDN 1.5 Mbit PRI on QSIG connectivities (these services were previously available only on ISDN 2.0 Mbit PRI connectivities):

- Basic Call Service
- 64 K clear bearer capability
- TIE call types
- Connected number delivery (COLP/COLR)
- Channel Negotiation
- Flexible Numbering Plan
- Enbloc dialing
- Overlap sending
- Overlap receiving
- Calling Line Identification Presentation and Restriction (CLIP/CLIR)
- Loop avoidance (transit count) on ETSI QSIG, not on ISO QSIG
- Party Category on ETSI QSIG, not on ISO QSIG.

Operating parameters

Meridian Customer Defined Network (MCDN) features cannot be interworked between an MCDN and QSIG interface, with the exception of basic call, Calling Line Identification Presentation/Restriction and Calling and Connected Line Presentation/Restriction.

Meridian 1 accepts up to three Progress Information Elements (IE) in one message on the QSIG interface.

The maximum length of an ISDN message is limited to 260 bytes.

Only circuit mode connection is supported.

nB+D is not supported for QSIG.

Feature interactions

Backup D-Channel

Backup D-Channel is not supported on the QSIG interface.

ISDN Signaling Link

ISDN Signaling Link (ISL) on QSIG operation is not supported on ISDN BRI trunking for Options 51C to 81C. For Option 11C, ISL on QSIG is not supported.

Network Attendant Services

ISDN QSIG Basic Call interacts with Network Attendant Services (NAS) as if the call is going to a route without NAS being equipped.

Network Automatic Call Distribution

Network Automatic Call Distribution signaling is not supported on the QSIG interface. Network ACD operation on QSIG is the same as the existing Network ACD treatment for unsupported interfaces.

Network Call Redirection

When a call is terminated on the Meridian 1 and Network Call Redirection (NCR) is active, the QSIG Basic Call can still operate; however, the original called number and redirection number IE that are used by NCR will not be sent on the QSIG interface.

Network Call Trace

Network Call Trace is not supported on the QSIG interface.

Network Calling Party Name Display

Network Calling Party Name Display (NCPND) is supported within the Meridian Customer Defined Network only. When QSIG is involved in the call setup, the existing NCPND operation on unsupported interfaces applies on QSIG.

Network Message Service

Network Message Service (NMS) is only supported on the Meridian Customer Defined Network. NMS operation on QSIG is the same as the existing treatment for unsupported interfaces.

Network Ring Again

Network Ring Again signaling is supported within the Meridian Customer Defined Network only. Network Ring Again requests which go through the QSIG interface will not be supported.

Remote Virtual Queuing

Remote Virtual Queuing (RVQ) does not operate on the QSIG interface. The existing RVQ operation on unsupported interfaces applies on the QSIG interface.

Trunk Route Optimization

Trunk Route Optimization (TRO) is supported within an MCDN network only. When a redirecting node sends a message to the originating node and the TRO request is accepted, the new call will go through the QSIG interface just as a normal basic call. However, TRO signaling will not be able to operate on the QSIG interface.

Virtual Network Service

A QSIG link can be used as a B-channel for the Virtual Network Service (VNS) over a private network. All VNS services are supported as normal. QSIG is only used as a speech bearer.

Feature packaging

The following packages are required for ISDN QSIG Basic Call services:

- Digit Display (DDSP) package 19;
- Integrated Services Digital Network (ISDN) package 145;
- Primary Rate Access (PRI) package 146;

- 2.0 Mb Primary Rate Access (PRI2) package 154;
- Overlap Signaling (OVLP) package 184;
- International Primary Rate Access (IPRA) package 202;
- ISDN QSIG Basic Call (QSIG) is package 263.

Feature implementation

Task summary list

The following is a summary of the tasks in this section:

- 1 LD 17 – Assign Configuration Record.
- 2 LD 16 – Define the Route Data Block.
- 3 LD 97 – System Configuration.

LD 17 – Assign Configuration Record.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Action Device and Number.
- ADAN	CHG DCH x	Change input/output device. x = 0-63
...		
-- IFC	ISIG ESIG	Interface ID for ISO QSIG download table. Interface ID for ETSI QSIG download table.
...		
TIMR	(NO) YES	NO = skip timer prompt. YES = change timer value.
T310	110 - (120)	The timer is used to define how long Meridian 1 can wait for the response message when the QSIG outgoing call is in an outgoing call proceeding state.

LD 16 – Define the Route Data Block.

Prompt	Response	Description
REQ	NEW CHG	New, or change.
TYPE	RDB	Route Data Block.
DTRK	YES	Digital Trunk Route.
...		
DGTP	PRI PRI2 BRI	1.5 Mb PRI. 2.0 Mb PRI. Basic Rate Interface.
IFC	ISIG ESIG	New DCH interface identification as entered in LD 17.

LD 97 – System Configuration.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	SYSM	System parameters for Multi-purpose Serial Data Link (MSDL) or Multi-purpose ISDN Signaling Processor (MISP).
...		
FDLC	p1 p2 p3 p4	Fast download control parameters. p1 = Application will be set to PRIE or BRIE. p2 = Specifies conditional (C) or forced downloading (F). p3 = Specifies current (C), latest (L) and specified (S) version. p4 = xx (version number if p3 = S).

Feature operation

There are no operating procedures specified for this feature.